

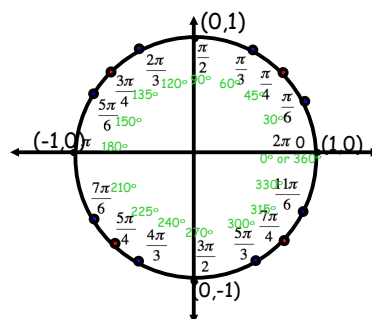
Precalc Warm Up # 9-3

1. Find $\sin(\arctan x)$

2. Solve on $[0, 2\pi)$ and find the general solution:

$$3\sin^2 x - \sin x - 2 = 0$$

2. $3\sin^2 x - \sin x - 2 = 0$



In Exercises 1–10, determine the exact values of the sine, cosine, and tangent of the given angle.

1. $75^\circ = 30^\circ + 45^\circ$

3. $105^\circ = 60^\circ + 45^\circ$

5. $195^\circ = 225^\circ - 30^\circ$

7. $\frac{11\pi}{12} = \frac{3\pi}{4} + \frac{\pi}{6}$

9. $\frac{17\pi}{12} = \frac{9\pi}{4} - \frac{5\pi}{6}$



① tangent 75°

$= \tan(30^\circ + 45^\circ)$

$= \frac{\tan 30^\circ + \tan 45^\circ}{1 - \tan 30^\circ \tan 45^\circ}$

$\frac{\frac{\sqrt{3}}{3} + 1(\frac{1}{3})}{1 - (\frac{\sqrt{3}}{3})(1)}$

$= \frac{(\frac{1}{3}) - \frac{\sqrt{3}}{3}(1)}{\frac{\sqrt{3} + 3}{3}}$

$= \frac{\frac{\sqrt{3} + 3}{3}}{\frac{3 - \sqrt{3}}{3}}$

$= \frac{\sqrt{3} + 3}{3} \cdot \frac{3}{3 - \sqrt{3}} \cdot \frac{3 + \sqrt{3}}{3 + \sqrt{3}}$

$= \frac{9 + 6\sqrt{3} + 3}{9 - 3}$

$= \frac{6(2 + \sqrt{3})}{6}$

In Exercises 1–10, determine the exact values of the sine, cosine, and tangent of the given angle.

1. $75^\circ = 30^\circ + 45^\circ$

3. $105^\circ = 60^\circ + 45^\circ$

5. $195^\circ = 225^\circ - 30^\circ$

7. $\frac{11\pi}{12} = \frac{3\pi}{4} + \frac{\pi}{6}$

9. $\frac{17\pi}{12} = \frac{9\pi}{4} - \frac{5\pi}{6}$

In Exercises 11–20, simplify the given expression.

11. $\cos 25^\circ \cos 15^\circ - \sin 25^\circ \sin 15^\circ$

13. $\sin 230^\circ \cos 30^\circ - \cos 230^\circ \sin 30^\circ$

15. $\frac{\tan 325^\circ - \tan 86^\circ}{1 + \tan 325^\circ \tan 86^\circ}$

17. $\sin 3 \cos 1.2 - \cos 3 \sin 1.2$

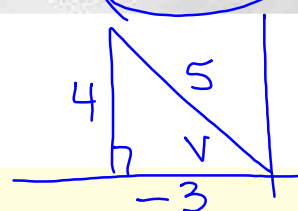
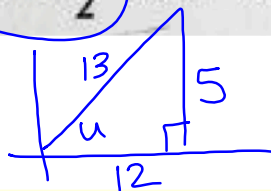
19. $\frac{\tan 2x + \tan x}{1 - \tan 2x \tan x}$

In Exercises 21–24, find the exact value of the trigonometric function given that

$\sin u = \frac{5}{13}$, $0 < u < \frac{\pi}{2}$ and $\cos v = -\frac{3}{5}$, $\frac{\pi}{2} < v < \pi$.

21. $\sin(u + v)$

23. $\cos(v + u)$



$\cos u \cos v - \sin u \sin v$
 $\left(\frac{12}{13}\right)\left(-\frac{3}{5}\right) - \left(\frac{5}{13}\right)\left(\frac{4}{5}\right)$

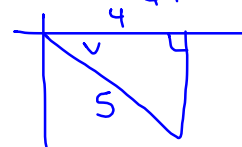
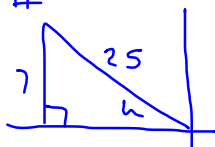
In Exercises 25–28, find the exact value of the trigonometric function given that

$$\sin u = \frac{7}{25}, \frac{\pi}{2} < u < \pi \quad \text{and} \quad \cos v = \frac{4}{5}, \frac{3\pi}{2} < v < 2\pi$$

25. $\cos(u + v)$

27. $\sin(v - u)$

Q II



$$\cos u \cos v - \sin u \sin v$$

$$\left(\frac{?}{25} \right) \left(\frac{4}{5} \right) - \left(\frac{7}{25} \right) \left(\frac{?}{5} \right)$$

Use the Δ 's in correct quadrants above to fill in the others & Simplify

In Exercises 29–48, verify the given identity.

29. $\sin\left(\frac{\pi}{2} + x\right) = \cos x$ → Use the sum formula for sine:

$$\sin\left(\frac{\pi}{2} + x\right)$$

$$\stackrel{?}{=} \cos x$$

31. $\cos\left(\frac{3\pi}{2} - x\right) = -\sin x$

$$\sin \frac{\pi}{2} \cos x + \cos \frac{\pi}{2} \sin x \stackrel{?}{=} \cos x$$

$$(1) \cos x + (0) \sin x \stackrel{?}{=} \cos x$$

use cosine formula

$$\cos \frac{3\pi}{2} \cos x + \sin \frac{3\pi}{2} \sin x \stackrel{?}{=} -\sin x$$

$$\checkmark \cos x = \cos x$$

?

⋮

✓

Was $\log(x + y) = \log x + \log y$?

Is $\sin(u + v) = \sin u + \sin v$?

Sum and difference formulas:

$$\sin(u \pm v) = \sin u \cos v \pm \cos u \sin v$$

$$\cos(u \pm v) = \cos u \cos v \mp \sin u \sin v$$

$$\tan(u \pm v) = \frac{\tan u \pm \tan v}{1 \mp \tan u \tan v}$$

Find all solutions in interval $[0, 2\pi)$

$$\tan\left(x + \pi\right) - \cos\left(x + \frac{\pi}{2}\right) = 0$$

Find all solutions in interval $[0, 2\pi)$

$$\tan(x + \pi) - \cos(x + \frac{\pi}{2}) = 0$$

$$\frac{\tan x + \tan \pi}{1 - \tan x \tan \pi} - (\cos x \cos \frac{\pi}{2} - \sin x \sin \frac{\pi}{2}) = 0$$

$$\frac{\tan x + 0}{1 - (\tan x)(0)} - ((\cos x)(0) - (\sin x)(1)) = 0$$

$$\tan x - (0 - \sin x) = 0$$

$$\frac{\sin x}{\cos x} + \frac{\sin x}{1} \frac{\cos x}{\cos x} = 0$$

$$\cancel{\cos x}, \frac{\sin x + \sin x \cos x}{\cancel{\cos x}} = 0 (\cos x)$$

$$\sin x (1 + \cos x) = 0$$

$$\sin x = 0 \quad \cos x = -1$$

$$\boxed{x = 0, \pi}$$

HW: p. 431 #35, 37, 55, 57 - 61 odd

p. 422 #9-37 every other odd

Group Verify: today

Quiz 6.1-6.3: Friday

(Simplify, Verify Identities, Solve Trig equations)

❖ All without any of the 6.4-6.5 formulas!